

How to Cite:

Kadam, G., & Bhatkule, M. (2022). Diagnostic utility of cellblock technique in reporting body fluid cytology. *International Journal of Health Sciences*, 6(S2), 13727–13734. <https://doi.org/10.53730/ijhs.v6nS2.8667>

Diagnostic utility of cellblock technique in reporting body fluid cytology

Dr. Ganesh Kadam

Assistant Professor, MGM Medical College, Aurangabad, Maharashtra

Dr. Milind Bhatkule*

Associate Professor, Aiims, Nagpur, Maharashtra

*Corresponding author

Abstract---Introduction: Body fluids are processed by routine cytology techniques like preparing a slide and staining it with PAP stain. By this method it is difficult to give definitive diagnosis particularly to the cases where some abnormal cells seen suspicious of malignancy. In our study we utilized cell lock technique for reporting body fluid cytology. Objectives: Our objective is to prepare cellblock from body fluid, to use it for diagnosis of benign and malignant lesions and also to check advantage and drawbacks of cell block technique over the conventional cytology examination. Materials and Method: This study was carried out in medical collage hospital in Department of Pathology. We selected total 52 body fluids with good cellularity for cell block preparation. Result: Out of 52 cases 45 were diagnosed as benign and 7 as malignant using cell block technique. Conclusion: We conclude with findings that cell block technique is better than routine cytology technique. By cell block technology tissue architecture can be well appreciated and definite diagnosis can be given. Also, we can utilize cell block for definitive diagnostic methods like Immunohistochemistry.

Keywords---PAP stain, immunohistochemistry, cell block.

Introduction

Cytological examination body fluids is in use for diagnosis of non-malignant and malignant lesions from many years¹. Many times in body fluids routine cytology slides unable to give definitive diagnosis. This may be due to reactive mesothelial cells, lack of tissue architecture, inability to apply Immunohistochemistry. These difficulties can be overcome by using cell block preparation. Cell block can show definite architecture and can be utilized for IHC.^{2,3,4,5,6,7,8} Cell block technique was first started in 19th century. Though cell block technique is simple to do it is

not popular or very less utilized even today. In our study we prepared cell block from body fluids like pleural fluids, ascitic fluids, pericardial fluids, synovial fluids which are sent for routine cytological examination. Samples with less cellularity blood clots were excluded from the study. Our aim of the study is to prepare cellblock from body fluid, to check any technique related problems, to see any advantages or disadvantages of cell block technique.

Materials and Method

All the body fluids for which cytological examination advised are centrifuged. Fluids in which visible precipitate seen at the bottom of test tube are selected for study. Fluids containing blood clot are excluded. All samples were divided in two, one is processed by routine cytology technique by preparing slides from centrifuged sample and other utilized for Cell block preparation.

Routine cytology procedure

Materials: Cytospray/Alcohol ether fixative, Glass slide, Centrifuge tube, PAP stain. Fluid samples centrifuged at 4000rpm for 5 minutes. Precipitate at the bottom test tube spread over slide and fixed with cytospray or alcohol ether. Slides stained with routine PAP stain.

Cell Block procedure

Materials

- Centrifuge machine
- Centrifuge tube
- Modified Nathans Fixative ie alcohol formalin fixative (9 parts of absolute alcohol and 1 part of 40% formalin) ⁹
- Whatman filter paper no.1
- Histopath tissue processing Unit
- H and E Stain

Method for cellblock preparation

Fluid samples centrifuged at 4000 rpm for 5 minutes. Supernatant discarded and Modified Nathan fixative added in centrifuge tube. Tube again centrifuged and Kept for 6 hrs. Supernatant discarded. Now cell pellet in the form of precipitate is ready for histopath processing, Cell pellet carefully removed from bottom of test tube and placed over Whatman Paper no.1. This tissue with whatman paper no. 1 placed in tissue cassette and processed in Automated tissue processor using 13 hr schedule. After processing cellblock placed in paraffin block and sections taken at 3 micrometer thick. These sections stained with H and E stain. Cytology smear and Cell block were examined separately.

Observations and Results

Table no.1 Distribution of different Body Fluids

Type of Body Fluid	No. of cases	% of Total cases
Pleural Fluid	28	53.84
Ascitic Fluid	18	34.61
Pericardial Fluid	04	7.6
Synovial Fluid	02	3.95

From table 1 most common body fluid in our study is pleural fluid 53.84% cases while synovial fluids were only 3.95%

Table 2 : Age distribution of the 52 cases

Age (In years)	Body fluids	%
0-10	2	3.84 %
11-20	5	9.61 %
21-30	8	15.38 %
31-40	11	21.15 %
41-50	3	5.76 %
51-60	10	19.23 %
61-70	7	13.46 %
71-80	3	5.76 %
81-90	3	5.76 %
TOTAL	52	100%

Most common age group was 31 to 40yrs 21.15% while pediatric patients were least common.

Table 3 : Sex Distribution of Body Fluids

Type of Fine Needle Aspirates	Male		Female	
	Number	Percentage	Number	Percentage
Pleural Fluid	10	40	4	11.4
Ascitic Fluid	0	0	10	28.57
Pericardial Fluid	3	12	6	17.14
Synovial Fluid	4	16	3	8.57
Total	32	100	20	100

From table 3 Male as to female ratio is 1.6. In males pleural fluid is most common consists of 40% cases. In female most common Body fluid is Ascitic Fluid consists of 28.57%.

Table 4 : Distribution of cases according to Cell block diagnosis

Diagnosis by cell block	No. of Cases	Percentage
Malignant	07	13.46
Benign	45	86.54
Total	52	100

From table 4 Out of total cell block diagnosis,86.54% cases were diagnosed as benign and 13.46 % cases were diagnosed as malignant.

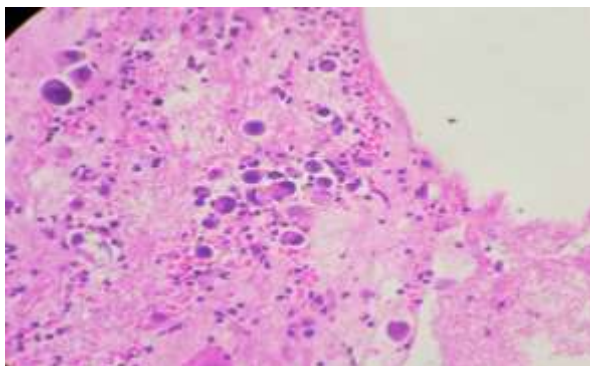


Image 1 Photomicrograph from section from pleural fluid cell block shows large scattered cells with hyperchromatic pleomorphic nuclei diagnosed as positive for malignant cells. (40X, H and E stain)

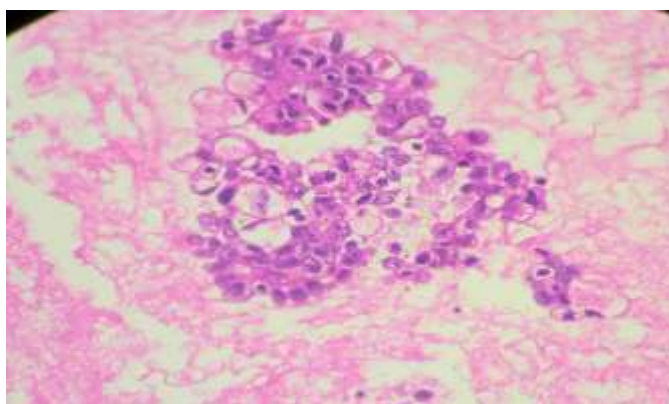


Image No2. Photomicrograph of Section from Ascitic fluid cell block,60yrs female with ovarian mass, section shows cells arranged in glandular architecture, cells are large with hyperchromatic pleomorphic nuclei and scanty cytoplasm diagnosed as adenocarcinoma deposits. (40X,H and E stain)

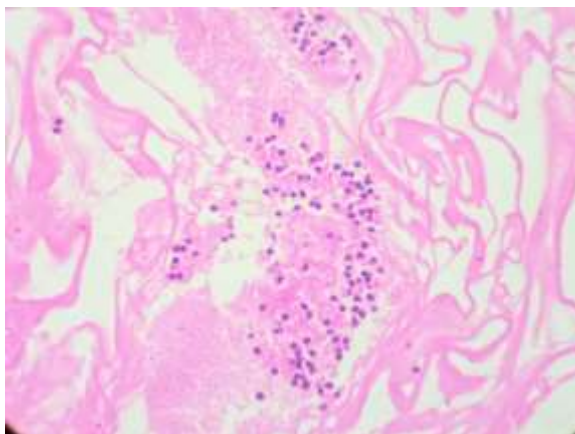


Image No 3. Photomicrograph of section from synovial fluid cell block shows chronic inflammatory cells, negative for malignant cells. (40X, H and E)

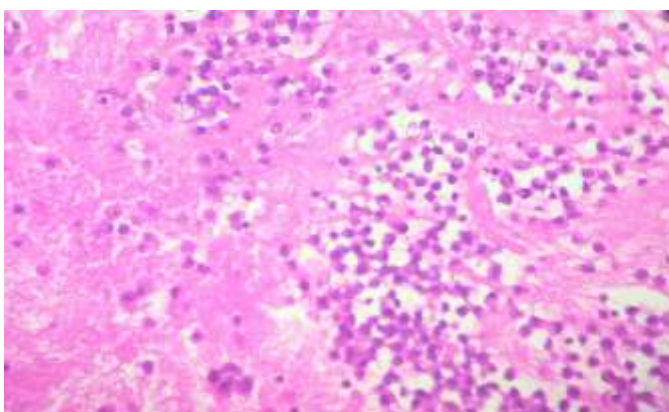


Image No 4. Photomicrograph of section from pleural fluid cell block consists of lymphocytes and few plasma cells, negative for malignant cells. (40X, H and E stain)

Table 5 : Distribution of cases according to histologic (cellblock) diagnosis

Site	Benign	Malignant
Pleural Fluid	22	03
Ascitic Fluid	17	04
Pericardial Fluid	04	00
Synovial Fluid	02	00

From table 5 out of 25 pleural fluids 22 were benign and 3 were malignant. In ascitic fluids 17 were benign and 4 were malignant. Pericardial and synovial fluids were benign on cell block diagnosis.

Table 6 : Correlation between cell block and cytologic diagnosis in Body fluids

FNACs	No. of Cases	Percentage
Positive correlation for malignant lesions	6	11.53
Noncorrelation for malignant lesions	1	1.92
Positive correlation for benign lesions	45	86.53
Noncorrelation for benign lesion	00	00
Total	52	100

From table 6 There is positive correlation 11.53 cases for malignancy. Non correlation in malignancy was found in one pleural fluid case where on cytology it was diagnosed as negative which turned out positive by cell block after serial section study. Case was of secondary from Carcinoma breast. Total 86.53% of total cases showed positive correlation for benign diagnosis.

Discussion

In present study we selected cytological fluid which are sent for cytological examination. Cellularity of fluids assessed and cell block prepared. All cases were selected randomly. Of the total body fluids, pleural fluids were 53.84 % followed by ascitic fluid, pericardial fluid and synovial fluid. All age groups were selected randomly. All above patient characteristics were not compared with any study as in this study we analysed technique and utility of cell block method rather than patients clinical profile. In our study male constitute 61.53 % and female 38.46 % with Male : Female ratio 1.59. In our study we found that many a times we obtained a tissue fragments in fluids which have shown good tissue architecture on cell block. Similar findings mentioned by Oslon¹⁰ et al (1986), Wojcik and Selvaggi¹¹ (1991), Zito¹² et al (1995), Nayyar¹³ et al (1998), Kawan¹⁴ (1998), Richard¹⁵ (1999), Musso¹⁶ et al (2005) Pillai¹⁷ (2008) , Thapar¹⁸ et al (2009). In our study cytology slides and cell blocks were evaluated separately .Positive for malignancy were 13.46 % cases .In his study Wojcik¹¹ et al (1991) given 53.57% cases as malignant by cell block whereas Zito¹² et al (1995) given in 41% cases ,Nathan⁹ et al(2000) given 31.41% cases as malignant In her study Thapar¹⁸ et al(2009) found 85.7% cases were positive for malignancy. Diagnosis of benign lesion by cell block in our study was 86.54 % Wojcik¹¹ (1991) given diagnosis of benign lesion in 36.9% cases, whereas Zito¹² (1995) and Nathan⁹ (2000) had given in 50.45% and 68.38% cases respectively. In our study percentage of malignancy is less as compared to other studies because in our study we included only body fluids for cell block preparation.

Out of 52 cases in our study diagnosis was correlated with cytology in 51 cases. Except for one case where on cytology it was benign and on cell block it turn out to be malignant. Positive correlation for malignancy was found in total 6 (11.53%) cases. Non correlation for malignancy was found in one case of asitic fluid where cytology given benign and cell block as malignant. This is due to presence of tissue fragment in cell block which shown glandular pattern of cells which was missed in cytology preparation. That patient was having primary in ovary. In one pleural effusion case we applied ER,PR marker for positive slide, which were positive. This patient was known case of Carcinoma Breast. Wojcik¹¹ et al (1991) showed that 84% of cases had identical results on both smears and cell blocks.

Nayyar¹³ et al (1998) observed cell block diagnosis same as smear diagnosis in 61% cases. Nathan⁹ et al (2000) found that smears were positive in 93.4% cases and 88.8% of cell blocks with an overall improvement in final diagnosis by 6.6% when smears were complemented by Cell block.

The findings and conclusion of present study are summarized as follows

1. Cell block from body fluids can be prepared easily if cellularity is good.
2. By preparing cell block we converted cytology sample in histopathology sample which can be stored for long time and if required fresh sections can be taken to see details.
3. cell blocks can be utilized for special stains and immunohistochemistry, which increases accuracy in diagnosis.
4. In one case diagnosis of malignancy was given by cell block which was negative by cytology slide. In this case tissue fragment identified on serial section of block which showed glandular architecture of malignant cells.
5. Cell blocks can be used for applying Immunohistochemistry, so primary site can be identified.
6. Cell blocks can be used for special stains.
7. Drawback of cell block is that it requires cellularity, also blood clots can interfere with results.

References

1. Reagan JW. Exfoliative cytology of pleural, peritoneal and pericardial fluids. CA Cancer J Clin 1960; 10 :153-159.
2. Ko EC, Jhala NC, Shultz JJ, Chhieng DC. Use of panel of markers in the differential diagnosis of adenocarcinoma and reactive mesothelial cells in fluid cytology. Am j clin pathol 2001; 116: 709-715.
3. Deng H, Shi J, Wilkerson M, Meschter S, Dupree W, Lin F. Usefulness of s100p in diagnosis of adenocarcinoma of pancreas on fine needle aspiration biopsy specimens. Am j clin pathol 2008; 129: 81-88.
4. Domgala WM, Makiewski M, Tuziak T, Kram A, Weber K, Osborn M: Immunocytochemistry on fine needle aspirates in paraffin miniblocks; Acta Cytol 1990; 34(3): 291-296.
5. Kulshrestha R, Vijayan VK. Immunohistochemical staining on fine needle aspiration biopsy-cell block specimens in the differential diagnosis of lung cancers. Indian J Chest Dis Allied Sci 2009; 51: 21-25.
6. Harold MJK, Johana CMR, Pino JP, Willem JGM, Henk B, Petrus CM, Merryn VE, Antonius GJM. J Histochem; 48: 709-718.
7. Sandra JS, BEiyun C, Elizabeth H, Madeline V. Acta Cytol 2007; 51: 552-557.
8. Miller RT. The Focus- Immunohistochemistry, Cytopathology-from an immunohistochemist's perspective Propath(online) 2005 Jan. Available from URL: http://www.ihcworld.com/_newsletter/2005/200501_cytology.pdf.
9. Nathan NA, Narayan E, Smith MM, Horn MJ. Cell block cytology :Improved preparation and its efficacy in diagnostic cytology . Am J Clin Pathol 2000; 114: 599-606.
10. Oslon NJ, Gogle HK, Williams WL, Mettler FA Jr.. Processing of

- aspiration cytology samples : An Alternative method. *Acta Cytol* 1986; 30 :409-412. 14.
11. Zito FA, Gadaleta CD, Salvatore C, Filotico R, Labriola A, Marzullo . A modified cell block technique for fine needle aspiration cytology. *Acta Cytol* 1995; 39 : 93-99. 15.
 12. Nayyar WA, Latif SW. Fine needle aspiration biopsy in conjugation with cell block preparation; A study of 1000 cases. *The professional* 1998; 5(1): 1-5.
 13. Wojcik EM, Selvaggi SM. Comparison of smears and cell blocks in the fine needle aspiration diagnosis of recurrent gynecologic malignancies *Acta Cytol* 1991; 35 : 773-776. 17.
 14. Kawan G, Ulrich W, Redtenbacher S, Schreiber B, Zwick H. Kawan bronchial brush/cell block technique : Facillitation of the routine diagnosis of bronchial neoplasms. *Acta Cytol* 1998; 42 : 1409-1413. 18.
 15. Richard K, Dziura B, Hornish A. Cell block preparation as a diagnostic technique complementary to fluid-based monolayer cervicovaginal specimens. *Acta Cytol* 1999; 43: 69-73. 19.
 16. Musso C, Silva-Santos MC, Pereira FEL. Cotton block method. One step method of cell block preparation after fine needle aspiration. *Acta Cytol* 2005; 49: 22-26. 20.
 17. Pillai SB, Shanthakumari S. The significance of cell block and fine needle aspiration cytology in diagnosing a rare presentation of hepatocellular carcinoma (letter). *IJPM* 2008; 51(3): 459-460. 21.
 18. Thpar M, Mishra RK, Sharma A, Goyal V, Goyal V. Critical analysis of cell block versus smear examination in effusions. *Journal of cytology* 2009; 26(2): 60-64.